

## JOB COMPLETION REPORT

## RESEARCH PROJECT SEGMENT

STATE: ALASKA Name: Sport Fish Investigations of Alaska.

Project No: F-5-R-5 Title: Inventory, Cataloging and Population Sampling of the Sport Fish and Sport Fish Waters of the Cook Inlet Drainage.

Job No: 10-A

Period Covered: January 1, 1963 to December 31, 1963.

## Abstract:

Five Upper Cook Inlet lakes were investigated in 1963. Trapper Lake contained a fair native game fish population. Winter oxygen deficiency was deemed certain in some or all years in the remaining waters.

Experimental gill nets were employed in a population sampling study of 19 surveyed and managed lakes. A high catch frequency of 3.1 rainbow per night-fishing-hour was recorded at Finger Lake. Four nets set beneath the ice in March in this lake yielded 4 rainbows averaging 5.5 inches in length in 888 hours of effort.

Most of the successful trout fishing in stocked waters occurred at Bonnie Lakes. The average length of sport caught trout in Echo Lake decreased in 1963. This decrease in size is attributed to increased food competition. Six unstocked waters produced trout fishing success of one fish per angling-hour or better. Salmon runs were generally low in local streams. Fair success was attained at Cottonwood Creek. Strong runs of chum salmon entered east side Susitna River tributaries. Ice fishing was fair for small trout and juvenile salmon.

Rotenone concentration and distribution was computed for the rehabilitation of Lucille Lake. Net and minnow trap studies following treatment exposed no live fish.

#### Recommendations:

1. It is recommended that the cataloging and inventory program be continued. Evaluation for public use should be made before fishing pressure and private land interests become excessive for the available area.

2. It is recommended that the rehabilitation program be continued on lakes of high production potential, near population centers, which have become infested with undesirable fishes.

3. The following lakes in the Palmer-Wasilla area contain high populations of stickleback, and should be rehabilitated as soon as possible so that game fish populations may be established: Canoe Lake, Gooding Lake, Kepler-Bradley Lake.

#### Objectives:

1. To evaluate the extent, the potential and the current use of waters readily available to the area's anglers.

2. To investigate the sources for providing a supply of trout, char, and salmon eggs for experimental hatching and rearing.

3. To investigate the feasibility of, and formulate plans for, experimental rehabilitation.

4. To investigate and measure the sport fish population trends in major recreational fishing waters which are readily available to the area's anglers.

5. To provide recommendations for the management of those waters.

#### Techniques Used:

1. Basic surveys for physical, chemical, and biological characteristics were accomplished on five lakes which had heretofore never been cataloged. Four waters were accessible by float plane, and one by 4-wheel drive vehicle. Unfavorable flying weather conditions during late summer prevented further planned surveys of lakes without road access.

2. Variable mesh, 125-foot experimental type gill nets were used for population studies. Each lake sampled received a minimum of one net for at least a 24-hour period. With the use of an ice jigger, four nets were placed under the ice of Finger Lake to check survival and condition of the August 1962 rainbow trout plant. This was the pilot plant in the toxaphene-rehabilitated lake.

3. Creel census data obtained at local lakes and streams was designed to determine species composition, age class composition, and rate of success.

4. A Hach Colorimeter and Hellige pocket pH comparator were used for dissolved oxygen and pH tests of 33 lakes.

5. Preparation for the rehabilitation of Lucille Lake included determination of water volume and the possibility of reduction of volume by manipulation at the outlet structure. The lake was divided into five sections, and the volume was computed for each. The proper amount of rotenone was calculated for each section. Following treatment, two gill nets and three baited minnow traps were employed to evaluate the effectiveness of the program. The nets and traps were removed after a five-week period, immediately prior to ice cover.

#### Findings:

The single cataloged lake considered capable of supporting salmonoid populations was Trapper Lake (TABLE 1). Fair native populations of rainbow trout and grayling were present. Muleshoe Lake produced four rainbow in the nets, but it and the other waters surveyed were considered too shallow for consistent, adequate over-winter oxygen supplies. Results of individual lake surveys, recorded on standard lake survey forms, are on file in the Palmer, Anchorage and Juneau offices.

TABLE 1. Lakes Receiving Basic Surveys, 1963

Name	Location
Little Horseshoe Lake	T 17N, R 4W, Sec. 11
Muleshoe Lake	T 17N, R 4W, Sec. 10
Pear Lake	T 17N, R 3W, Sec. 6
Trapper Lake	T 22N, R 5W, Sec. 20
Elk Lake	T 17N, R 2E, Sec. 26

A summary of population sampling for 12 stocked lakes, 3 lakes rehabilitated in 1961 with toxaphene, 2 of the 5 surveyed waters, and 1 lake recommended for stocking is found in TABLE 2. The remaining two waters produced no fish in the nets. Complete records of test net results are on file at the Palmer office. Finger Lake yielded the highest catch frequency, 3.1 rainbow per test-net-night-hour<sup>1</sup> in August. This lake was rehabilitated with toxaphene in 1961 and planted in the fall of 1962. The fish averaged 11.1 inches in length, indicating that excellent survival and growth had occurred. A total of 888 hours of test net fishing yielded 4 rainbow between 5.2 and 5.8 inches in length. The growth rate was less than that of 1962 planted rainbow in nearby Echo Lake by 15 per cent. Catch frequencies in excess of one fish per night-fishing-hour were also obtained at Echo, Ravine and Wiener Lakes.

The creel census indicated that Bonnie and Upper Bonnie Lakes were the best producing stocked waters in 1963 (TABLE 3). Opening weekend success at Echo Lake decreased from .18 fish per hour in 1962 to about .1 fish per hour. Average size also decreased from 15.5 inches to 12.8 inches. The size decrease of the age 2 rainbow, which made up the bulk of the catch, is a result of increased competition with each plant introduced to the 23-acre lake. The drop in fishing success was echoed by a decrease in test net catch from 2.0 fish per night-fishing-hour in 1962 to 1.6 fish per hour. The reason for the apparent mortality on the fish plant reaching age 2 in 1963 is not clear.

Highest fishing success for trout and grayling in unstocked waters was obtained at Cottonwood Lake, Seventeen Mile Lake, Caswell Creek, Cottonwood Creek, Nancy Creek and Little Susitna River. Each of these waters yielded one fish per hour of the angling effort or better (TABLE 4). The data from other listed waters indicating high success is inconclusive due to the small number of anglers interviewed. Post-spawner rainbow were responsible for the high success at Nancy Creek and nearby Lilly Creek, tributaries of Nancy Lake.

Salmon runs were generally low in the streams during 1963. Best success was at Cottonwood Creek, with an overall catch success of 0.5 fish per angling-hour and 1.7 fish per

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<sup>1</sup>Based on the time interval between sunset and sunrise.

TABLE 2. Results of Population Sampling by Gill Net, August 1963.

<u>Lake</u>	<u>No. of Nets</u>	<u>Hours per Net*</u>	<u>Species</u>	<u>No.</u>	<u>Length Range in Inches</u>	<u>Average Length</u>	<u>Fre- quency</u>	<u>Per Cent Compo- sition</u>
Bonnie	2	8.5	RB	34	5.8-11.6	11.3	2.0	100
Echo	2	8.5	RB	28	7.4-12.0	10.0	1.6	100
Falk	2	8.5	RB	15	6.6-11.6	8.8	.88	88.2
			SS	2	12.8-13.4	13.1	.18	11.8
Finger	3	8.5	RB	78	8.1-13.6	11.1	3.1	100
Florence	2	102	RB	1	11.2	11.2	.005	100
Irene	3	9	No Fish					
Kelly	3	9	RB	8	7.6-9.3	8.5	.3	89
			Sucker	1	8.6	8.6	.04	11
Knik	2	8.5	RB	7	5.9-20.6	12.9	.41	100
Long	2	8.5	RB	1	22.5	22.5	.06	11
			GR	8	8.0-16.9	10.8	.47	89
Lynn	2	8	RB	1	20.0	20	.06	100

\* Overnight Sets.

TABLE 2 (Cont.). Results of Population Sampling by Gill Net, August 1963.

<u>Lake</u>	<u>No. of Nets</u>	<u>Hrs. per Net*</u>	<u>Species</u>	<u>No.</u>	<u>Length Range in Inches</u>	<u>Average Length</u>	<u>Fre- quency</u>	<u>Per Cent Compo- sition</u>
Meiers	4	9	No Fish					
Muleshoe	2	8.5	RB	5	12.2-22	16.7	.29	100
Ravine	1	8.5	RB	9	5.7-12.3	9.3	1.1	100
Rocky	2	8.5	RB	1	16.3	16.3	.06	100
Trapper	3	8	RB	32	9.4-18	13.6	1.3	.55
			GR	3	6.1-10.5	9.2	.13	.05
			WF	22	7.2-13.7	10.3	.92	.37
			SS	2	6.4-11.4	8.9	.08	.03
Twelve- Mile	2	8	RB	2	14.5-15.0	14.8	.13	22.2
			SS	7	8.5-14.8	11.6	.44	77.8
Weiner	2	8.5	RB	33	6.0-13.3	8.2	1.9	89.1
			DV	4	6.3- 8.3	7.3	.24	10.9
Willow	3	9	RB	1	12.2	12.2	.04	10
			SS	9	5.7-11.6	9.5	.33	90

\* Overnight Sets.

TABLE 3. Summer Creel Census Results of Matanuska Valley Stocked Lakes, 1963.

<u>Lake</u>	<u>Spec.</u>	<u>No. in 2-In. Size Groups</u>								<u>Avg. Lqth.</u>	<u>Tot. Fish</u>	<u>Total Anqls.</u>	<u>Hours Fished</u>	<u>Fish Per Angler</u>	<u>Fish Per Hour</u>
		<u>6</u>	<u>8</u>	<u>10</u>	<u>12</u>	<u>14</u>	<u>16</u>	<u>18</u>	<u>20</u>						
Bonnie	RB	3	3	5	4			1		9.9	16	10	18	1.6	.89
Upper Bonnie	RB			1	1	1	1			12.9	4	2	4	2.0	1.0
Echo	RB		7	3	8	13	3	3	1	12.8	38	87	394	.44	.96
Falk	RB		2	9	1	1				10.2	13	52	209	1.2	.3
	SS			11	20	15	4			12.5	50				
Rocky	RB							3	3	18.5	6	13	74	.46	.08
Weiner	RB	2	2	3						8.3	7	11	22.5	.73	.35
	DV	1								6.0	1				

TABLE 4. Summer Creel Census Results of Matanuska Valley Unstocked Waters, 1963

Water	Spec.	No. in 2-In. Size Groups									Avg. Lnqth.	Tot. Fish	Total Angls.	Hrs. Fished	Fish Per Angler	Fish Per Hour
		6	8	10	12	14	16	18	20	21 or Over						
Big Lake	RB	1	25	6	6					1	8.9	39	14	53	2.9	.75
	DV									1	21	1				
Caswell Creek	GR	3	2	6	9	3	1				10.8	24	8	24	3	1
	WF				1						12.0	1				
	KS					1	1				15.3	2	31	131	.94	.22
	SS									19	24.8	19				
	DS									8	26.2	8				
298 Cottonwood Creek	RB	1	1	1	3						10.0	6	2	6	3	1
	SS							2		87	21.7	89	141	473	1.7	.5
	RS									147	22.0	147				
Cottonwood Lake	RB		2	29	17	5	1				10.9	54	6	49.5	9	1.1
Deception Creek	RB			1							9.0	1	3	4	2.3	1.8
	GR			6							10.0	6				
Fish Creek	RB	5	12	9			1				8.6	27	48	152.5	.9	.28
	SS									9	23.8	9				
	RS									6	-	6				
	DS									1	-	1				
Goose Creek	RB			1	1				1		13	3	1	1	3	3



TABLE 4 (Cont.). Summer Creel Census Results of Matanuska Valley Unstocked Waters, 1963.

Water	Spec.	No. in 2-In. Size Groups									Avg. Lngh.	Tot. Fish	Total Angls.	Hours Fished	Fish Per Angler	Fish Per Hour
		6	8	10	12	14	16	18	20	21 or Over						
Grey's Creek	GR		8	8	3	8					10.3	27	9	26	3.1	1.1
	WF				1						11	1				
Kashwitna Creek	RB		5	5	3	2	2				12.5	17	23	60	1	.38
	GR			2	1	2					10.3	5				
	WF				1						12	1				
Lilly Creek	RB										-	17	5	3	3.4	5.7
629 Little Susitna River	RB		1								8.2	1	16	13.5	1.3	1.5
	DV		7	6	3						9.5	16				
	WF				2						12	2				
	KS						1				14.5	1				
Meadow Creek	RB	6	2	5	1	1					9	15	15	42	2.1	.74
	SS	16									5	16				
Montana Cr.	SS									21	23.7	21	26	57.8	.81	.36
Moose Creek	KS									1	34	1	2	20	.5	.05
Nancy Creek	RB										-	40	13	27	3.1	1.5
Seventeen- Mile Lake	GR										-	30	9	20	3.3	1.5

TABLE 4 (Cont.). Summer Creel Census Results of Matanuska Valley Unstocked Waters, 1963.

Water	Spec.	No. in 2-In. Size Groups									Avg. Lgth.	Tot. Fish	Total Angls.	Hours Fished	Fish Per Angler	Fish Per Hour
		6	8	10	12	14	16	18	20	21 or Over						
Sheep Creek	GR	2		1	1						9	4	29	150	.87	.17
	DV		1								8	1				
	WF			2	2	2					12	6				
	Burbot									1		1				
	KS							1	1		18	2				
	DS									11	28.8	11				
Wasilla Creek	SS									2	23.5	2	15	17.5	.13	.11
Willow Creek	RB			12	3	1	2			2	-	20	64	161.5	1.9	.76
	GR		10	16	10	2					9.2	38				
	DV		1	1							9	2				
	WF			15	4	4		1			10.3	24				
	SS									14	-	14				
	DS									25		25				

angler. The catch consisted of red and silver salmon. The lack of silver salmon was partly compensated by strong runs of chum salmon in the east side Susitna River tributaries. TABLE 4 indicates that good numbers of this species were taken at Willow, Sheep and Caswell Creeks.

A good winter fishery for small rainbow trout in Echo Lake developed in February. The catch consisted of fish planted as fingerlings in the fall of 1962 which averaged 6.5 inches at the time of capture (TABLE 5). Big Lake also produced well, with Dolly Varden representing the bulk of the take. Some anglers also kept fingerling silver salmon. The winter fishing at Big Lake consistently produces a preponderance of Dolly Varden, while the summer fishery yields almost entirely rainbow trout. Test net sampling has indicated that a nearly equal proportion of each species is present. The high success at Lucille and Wasilla Lakes is due to the numbers of large fingerling silver salmon and rainbow taken.

Dissolved oxygen and pH tests were taken during late winter at 33 lakes (TABLE 6). Waters sampled included those currently stocked and those considered promising for stocking and maintenance.

Survey activities were undertaken in September to aid in the rehabilitation and evaluation of Lucille Lake. Water level and shoreline perimeter observations showed that no change in volume had occurred since the original volumetric survey was performed in 1955. It was decided that lowering the lake level would cause matting of the dense weed growth in spring areas at the shallow east end of the lake. To provide the best possible chemical distribution and to delay oxidation of the toxicant as long as possible in the spring areas, the lake was held at full pool for the treatment.

Four of the five sections in which the lake was divided by marked buoys were assigned 1.2 parts per million powdered rotenone. The fifth section, where the majority of dense weeds and springs were present, was assigned 1.7 parts per million. Following rehabilitation two variable mesh gill nets and three baited minnow traps were fished continuously in various locations in the lake until freezeup, a period of about five weeks. Location of the minnow traps was changed every few days to search the majority of known spring areas for surviving stickleback. The study, coupled with visual observation, produced no live fish.

TABLE 5. Creel Census Results of Winter Ice Fishery, Matanuska Valley Lakes, 1963.

Lake	Spec.	No. in 2-In. Size Groups									Avg. Lgth.	Tot. Fish	Total Angls.	Hours Fished	Fish Per Angler	Fish Per Hour
		6	8	10	12	14	16	18	20	21 or Over						
Big Lake	SS	20									6.3	20	18	72.5	2.5	.62
	DV	3		8	1		3	1		2	12.7	18				
	RB	2		2		1				2	13.3	7				
Echo Lake	RB	87			1						6.5	88	26	57.5	3.4	1.5
Lucille Lake	SS	54	12	4	11	Unknown Length - 80					7.2	161	35	66	4.6	2.4
Wasilla Lake	SS	4									6	4	5	8.8	8.0	4.6
	RB	28	6	1	1						7.1	36				

TABLE 6. Lakes Tested for Dissolved Oxygen Content, 1963.

Lake	Date	Location			Depth Of:			O <sub>2</sub> Samples		
		T	R	Sec	Water	Snow	Ice	Depth	PPM*	pH
Beach	2/29/63	15N	2W	12	9.5'	1"	32"	5'	5.4	5.0
Beaver	3/27/63	17N	3W	4	13'	10"	34"	5'	11.0	7.25
								10'	6.1	
Bonnie	3/18/63	20N	6E	19	27'	17"	31"	5'	9.8	7.5
								10'	8.3	
Bumblebee	3/29/63	19N	4W	30	25'	9"	38"	5'	13.1	7.25
								10'	9.7	
Campbell Reservoir	3/14/63	12N	4W	14	12'	2"	30"	5'	12.5	7.0
								10'	11.2	
Canoe	4/8/63	17N	1E	13	28'	0	31"	5'	9.7	7.5
								10'	6.0	
Crystal	3/29/63	19N	5W	25	21'	9"	39"	5'	14.3	7.0
								10'	10.2	
DeLong	3/14/63	18N	4W	10	18'	2"	30"	5'	10.0	6.5
								10'	8.4	
East Sunshine	3/21/63	24N	4W	8	23'	12"	34"	5'	10.2	7.0
								10'	8.5	

\* Parts Per Million

TABLE 6 (Cont.) Lakes Tested for Dissolved Oxygen Content, 1963.

Lake	Date	Location			Depth Of:			O <sub>2</sub> Samples:		
		T	R	Sec	Water	Snow	Ice	Depth	PPM*	pH
Echo	4/5/63	17N	1E	24	32'	0	30"	5'	7.0	7.25
								10'	5.8	
Falk	4/5/63	17N	2E	16	26'	0	28"	5'	7.4	7.25
								10'	6.4	
Finger	4/24/63	17N	1E	33-34	36'	.5"	25"	5'	10	7.25
								10'	9.5	
								15'	9.3	
								20'	9.2	
								25'	3.6	
								30'	0.2	
Florence	3/29/63	19N	5W	24	32'	9"	38"	5'	13.2	7.25
								10'	11	
Gooding	4/10/63	18N	1E	23	17.5'	7"	25"	5'	9.3	6.75
								10'	9.3	
Irene	4/8/63	17N	1E	13	33'	0	30"	5'	4.2	7.5
								10'	4.2	
Jewel	3/14/63	12N	4W	10	14'	3"	31"	5'	11.5	6.75
								10'	8.8	

\* Parts Per Million

TABLE 6 (Cont.) Lakes Tested for Dissolved Oxygen Content, 1963.

Lake	Date	Location			Depth of:			O <sub>2</sub> Samples:		
		T	R	Sec	Water	Snow	Ice	Depth	PPM*	pH
Johnson	4/24/63	17N	1E	14	48'	.5"	29"	5' 10'	9.7 8.3	7.25
Kepler-Bradley	4/8/63	17N	1E	24	37'	0	26"	5' 10'	7.5 7.4	7.5
Knik	4/25/63	16N	3W	19	37'	2"	30"	5' 10'	7.2 5.0	7.25
Long (Mile 86)	3/15/63	20N	7E	21	40'	18"	36"	5' 10'	12.2 11.3	7.75
Lorraine	3/29/63	14N	4W	23	35'	2"	29"	5' 10'	10.5 9	7.25
Lucille	4/25/63	17N	1W	8	21'	0	23"	5' 10'	11.4 10.9	7.5
Lynn	4/1/63	19N	4W	29	54'	6"	39"	5' 10'	9.7 8.8	7.25
Meiers	4/5/63	17N	1E	18	61	0	27"	5' 10'	0.5 0.7	7.0

\* Parts Per Million

TABLE 6 (Cont.) Lakes Tested for Dissolved Oxygen Content, 1963.

Lake	Date	Location			Depth Of:			O <sub>2</sub> Samples		
		T	R	Sec	Water	Snow	Ice	Depth	PPM*	pH
North Friend	3/30/63	24N	4W	29	19'	20"	35"	5'	7.0	7.0
								10'	5.4	
Peggy	3/21/63	24N	4W	31	15'	13"	37"	5'	14.2	7.25
								10'	11	
Question	3/30/63	25N	4W	30	69'	20"	35"	5'	13.1	7.25
								10'	9.9	
Ravine	3/15/63	20N	6E	19	17'	16"	36"	5'	4.2	7.5
								10'	3.3	
Rocky	3/27/63	17N	3W	16	21'	8"	35"	5'	10.7	7.0
								10'	9.3	
Twelve Mile	4/1/63	19N	2W	6	24'	22"	36"	5'	8.4	7.0
								10'	6.8	
Wallace	3/27/63	17N	2W	11	13'	3"	30"	5'	7.6	6.75
								10'	6	
West Sunshine	3/21/63	24N	4W	8	12'	12"	35"	5'	3.7	6.75
								10'	1.2	
Wiener	3/15/63	20N	7E	22	16'	18"	35"	5'	4.4	7.75
								10'	3.7	

\* Parts Per Million



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Otoliths "ear bones" are sometimes used to determine the age of a fish when scales cannot be used.